two electrodes and closely adhered thereto by bonding, using a fluoride containing adhesive resin mixed with N-methylpyrrolidone solvent and in which the N-methylpyrrolidone solvent is evaporated to produce through holes, which communicate the positive electrode active material layer 7 and the negative electrode active material layer 9 with the separator 4.

REMARKS

Favorable consideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 8-13 remain active, Claims 8 and 13 having been amended by way of the present amendment.

In the outstanding Office Action dated February 23, 2001, Claims 8-12 were rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (U.S. Patent No. 5,741,603). Claim 13 was indicated as being objected to being dependent on a rejected claim, but otherwise indicated as including allowable subject matter.

Applicants acknowledge with appreciation the courtesy of the interview granted to Applicants' attorney on June 21, 2001 at which time the outstanding issues in this case were discussed. During the interview, the above changes to the claims were proposed and arguments substantially as hereinafter developed were presented. Also, the double patenting implications in regard to the proposed amended claims and the claims which issued from the parent application in U.S. patent 6,124,061 were discussed. The Examiner indicated that the proposed claim changes appear to distinguish over the art of record, but no formal agreement was reached pending the Examiner's detailed consideration of the application upon formal submission of a response to the outstanding Official Action.

Applicants acknowledge with appreciation the indication that Claim 13 includes allowable subject matter. Since Applicants believe themselves entitled to the patent scope stated in amended Claim 8, for the reasons noted hereinafter, Claim 13 has been maintained in dependent form. However, Claim 13 has been amended to more clearly define the claimed subject matter without adding new matter.

Claim 8 has been amended to clarify that the evaporation of the N-methylpyrrolidone, used as a solvent in the adhesive layer, achieves the production of through holes in the adhesive layer. Thus, amended Claim 8 reflects Applicant's inventive contribution including selection of a particular adhesive resin and solvent to create through holes, whereby the advantages of preventing the peeling between the electrodes and the separator and an increased ionic conductivity noted at page 11, line 19 through page 12, line 17 of the specification are achieved.

Chen discloses at column 3, lines 21-45 adhesive material 20 and identifies poly (vinylidene fluoride) as one of several non-fluoride containing materials.

Also, Chen mentions solvents at column 14, lines 11-33 for electrolyte active species for separator 32, including N-methyl-2-pyrrolidone (column 4, line 23), but no mention is made of NMP as solvent for the adhesive layer 20 and no mention is made of NMP as a solvent for an adhesive layer including fluoride resin. Instead, Chen discloses a different solvent, tetrahydrofane (THF) to be used with a polyurethane adhesive in each of the three examples given.[1] Chen provides no teaching of coating an adhesive resin solution including a fluoride resin and N-methylpyrrolidone solvent.

Further, although Chen notes that adhesive layer "may be porous" (column 3, line 38), no disclosure is made of creation of through holes by which the electrodes are placed in

[1]Chen, column 5, lines 4-9, lines 32-36, and lines 52-56.

communication with the separator and provides no indication that ratio of solvent to adhesive material affects porosity and ratio must be selected specifically to achieve through holes, as evident from Applicant's disclosure (page 13, lines 1-6).

Therefore, Chen provides 1) no disclosure of N-methylpyrrolidone as an adhesive solvent, 2) no disclosure of combination of fluoride resin and 3) no disclosure of the creation of through holes by which the electrodes are placed in communication with the separator, all of the above claimed features increasing the ionic conductivity of the battery. On that basis it is respectfully submitted that Claim 8 is also patentably distinguishing over Chen et al.

Accordingly, it is respectfully submitted that Claim 8, as well as Claims 9-13 dependent from Claim 8, patentably define over the applied prior art and are in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND, MAIER & NEUSTADT, P.C.

Gregory J. Maier
Registration No. 25,599
Eckhard H. Kuesters
Registration No. 28,870
Attorneys of Record

22850
(703) 413-3000
Facsimile (703) 413-2220
GJM:EHK/RFF/lfc
I:\atty\RFF\194679\194679.am.wpd

Marked-up Copy

Serial No: 09/629,886
Amendment Filed On: June 21, 2001

IN THE CLAIMS

Please amend Claims 8 and 13 as shown below.

8. (Amended) A method of fabricating a lithium ion secondary battery, comprising the steps of:

preparing a positive electrode by forming a positive electrode active material layer on a positive electrode collector;

preparing a negative electrode by forming a negative electrode active material layer on a negative electrode collector;

preparing an adhesive resin solution, by dispersing a fluoride resin or a mixture containing a fluoride resin as the main component in N-methylpyrrolidone;

coating said adhesive resin solution to at least one of a [the] surface of the positive electrode active material layer and a respective [the] facing surface of a [the] separator and to at least one of a [the] surface of the negative electrode active material layer and a respective [the] facing surface of the separator;

fitting the positive electrode active material layer and the negative electrode active material layer upon respective surfaces of said separator;

evaporating said N-methylpyrrolidone from said adhesive resin solution to form porous adhesive resin layers to produce through holes that communicate said positive electrode material layer with said separator and that communicate the said negative electrode material layer with the said separator, and so as to bond the positive electrode active material

layer and the negative electrode active material layer upon respective surfaces of said separator to form a laminated body; and

supplying a lithium ion-containing electrolytic solution to said laminated body.

13. (Amended) The method of fabricating a lithium ion secondary battery according to claim 8 wherein said step of coating comprises a step of dipping the separator in an emulsified solution of the adhesive resin and then pulling the separator [it] up.

IN THE ABSTRACT

Please rewrite the abstract of disclosure as shown below:

[To obtain] A method of fabricating a lithium ion secondary battery, wherein a [having excellent charge and discharge characteristics in which electric connection between electrodes can be maintained without requiring a strong armor metal case, so that it can be made into thin forms having large energy density. A] positive electrode 3 is prepared by bonding a positive electrode active material layer 7 to a positive electrode collector 6, a negative electrode 5 is prepared by bonding a negative electrode active material layer 9 to a negative electrode collector 10 and a separator 4 which is arranged between these two electrodes and [keeps a lithium ion-containing electrolytic solution are] closely adhered thereto by bonding [the positive electrode active material layer 7 and the negative electrode active material layer 9 to the separator 4 by a porous adhesive resin layer 11, and an electrolytic solution is kept in through holes 12 formed in the adhesive resin layer 11], using a fluoride containing adhesive resin mixed with N-methylpyrrolidone solvent and in which the N-methylpyrrolidone solvent is evaporated to produce through holes, which communicate the positive electrode active material layer 7 and the negative electrode active material layer 9 with the separator 4.